ABSTRACT

A method for forming a trench in a semiconductor device is disclosed. An example method forms a pad oxide film and a silicon nitride film on a semiconductor substrate, selectively etches the silicon nitride film and the pad oxide film on a region to be formed with a trench, and implants oxygen ions into the semiconductor substrate in the region to be formed with the trench. The example method also forms an oxide in the semiconductor substrate by reacting the oxygen ions with the semiconductor substrate through a thermal diffusion of the oxygen ions, forms the trench by etching the semiconductor substrate and the oxide on the region to be formed with the trench using the silicon nitride film as a mask, forms a liner oxide film on an inner wall of the trench using a thermal diffusion process, and forms an insulation film on the liner oxide film such that the trench is filled.